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simultaneously substituted in said 5-position with a group consisting of an electron-acceptor or a p-delocalizing group.

REMARKS

Applicants and the undersigned are most grateful for the time and effort accorded the instant application by the Examiner. The Office is respectfully requested to reconsider the rejections presented in the outstanding Office Action in light of the following remarks. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. Applicant intends no change in scope of the claims by the changes made by this amendment and has introduced no new matter to the specification.

The Claimed Invention

The claimed invention provides and improved Alq3 derivatives for use in organic light emitting devices (OLEDs). The claimed compositions provide improved intrinsic luminescent yield by providing "using an electron-donor group (R^{PY}) in the 3- or 4-position and, at the same time, an electron-acceptor or p-delocalizing group (R^{Ph}) in the 5-position." Specification, page 7, lines 9-11. Moreover, the claimed Alq3 derivatives have "a larger intrinsic luminescence yield with a calculated enhancement factor up to four [to yield a] device [with] a larger quantum efficiency than any other device made by unsubstituted and undoped Alq3. Specification, page 8, lines 13-15. As more clearly

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defined by the amended claims, the compositions yield a device with improved properties over prior art devices. These improved properties are not suggested by the art of record.

The 35 USC § 112 Rejection

Claims 15-22 stand rejected under 35 U.S.C. 112, second paragraph, as indefinite for use of the term "zone" in claims 15 and 19. Reconsideration and withdrawal of the present rejection is hereby respectfully requested.

The use of "said compound" is rejected as lacking antecedent basis. The phrase has been more clearly defined by naming the compound, that is, tris(8-quinolinolato)aluminum(III) (Alq3).

Use of the term "zone" is rejected as not being clearly the same or distinguished from the word "layer." The Examiner states that it is "unclear if the luminescent layer is a separate layer or a layer within either hole injecting and transporting zone or electron injecting and transporting zone." With respect to components of an electroluminescent device zone is well known in the art and thus not indefinite. See, for instance US Patent No. 4,885,211 (hereafter "Tang") where claim 1 recites "[a]n electroluminescent device comprising in sequence, an anode, an organic hole transporting zone, an organic electron transporting zone, and a cathode...." (emphasis added, Column 24, lines 22-23). Further, the zones are clearly defined by their names.

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Nonetheless, to avoid any further rejections, claim 15 has been amended to more clearly state "first layer," "second layer" and "third layer." The amendment is fully supported by the specification on page 8, lines 4-10 which states:

An electroluminescent device using the Alq3 derivatives of the present invention preferably consists of a hole injection electrode, an electron injection electrode and at least one organic emitting layer incorporating at least one of the proposed Alq3 derivatives. It should be understood that the electroluminescent device may contain additional hole-transport layers between the hole injection layer and the organic emitting layers and/or additional electron transport layers between the electron injection electrode and the organic light-emitting layers.

The 35 USC § 103(a) Rejections

Claims 1-14 stand rejected under 35 U.S.C. 103(a) in view of Tang in view of Moore et al. (hereafter "Moore"). Claims 15-22 also stand rejected under 35 U.S.C. 103(a) in view of Tang and Moore as applied to Claims 1-14 and further in view of the statement in the written description (Page 8, lines 4-10) that the organic EL device could have two or three layers in addition to the electrodes. Reconsideration and withdrawal of the present rejections are hereby respectfully requested.

Claims 1-7 and 19-22 are deleted. Thus, the rejection and response herein apply solely to claims 8-18. Deletion of claims 1-7 and 19-22 is solely to expedite prosecution and does not disclaim any inventive subject matter nor is it meant to create estoppel for future prosecution of these claims. Applicant retains the right to pursue claims 1-7 and 19-22 in future patent applications.

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Tang discloses electroluminescent devices and generally describes the components of such devices. The Examiner previously acknowledged that "Tang does not disclose that Alq3 is substituted in 3- or 4- position with electron-donor group and in 5-positions simultaneously with an electron-acceptor or p-delocalizing group." (Office Action dated 8/26/02, page 4, lines 10-2).

Moore discloses mixed ligand aluminum chelates for use in electroluminescent devices. Moore discloses a large variety of substituents each of which can be placed at one or more of 6 positions and each of which may or may not be electron-donating or electron-accepting and any of which can be used in an electroluminescent device. Moore thus does not provide a teaching or suggestion of the instantly claimed composition. Combination of Moore and Tang fails to teach or suggest the instantly claimed invention.

As noted in the previous response by Applicant, and as more clearly defined by the claims, the instantly claimed invention requires specific substitutions of a very specific nature; substitutions at 3 or 4 and 5 and only electron-donating substituents at either position 3 or 4 and only electron-accepting substituents at position 5. These specific restrictions are not provided by Moore. In addition, the Moore compositions are physically different from those of the claimed invention. For instance, column 3, lines 56-60 read:

The advantage of employing an aluminum chelate with one or two substituted 8-quinolinolato ligand(s) and one or two ligand(s) which are not substituted 8 quinolinolato ligands is that all of the potential physical properties of tris(8-

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quinolinolato)aluminum(III) chelates are attained.
(emphasis added).

Clearly, a mixture of substituted ligands and unsubstituted ligands is not the same as the instantly claimed compounds and could not be expected to provide the same material properties of the claimed invention.

Moreover, the product produced by the Moore patent would not result in the instantly claimed invention. This is acknowledged by the Examiner in the statement that Moore 'teaches' "substitutes may be made in all six positions including 3-, 4- and 5-positions of the quinoline ring." Office Action page 4, lines 17-18. The instantly claimed invention does not allow for substituents at all positions and only allows for and requires specific substituents at specific positions. Moore does not teach or disclose these limitations. In discussing placement of substituents, Moore simply states:

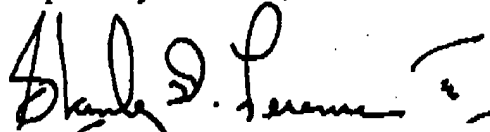
Substituents at the 4, 5 and 6 ring positions are not favorably located to hinder sterically or otherwise impair the bonding of three 8-quinolinolato nuclei to a single aluminum atom, while it is contemplated that large substituents at the 3 or 7 ring positions could provide sufficient steric hindrance. On the other hand, the 2 ring position is suited to provide hindrance (e.g., steric hindrance), and even a very small substituent (e.g., a methyl group) in this ring positions can provide an effective blocking substituent. For synthetic convenience it is specifically preferred that steric blocking substituents be located in the 2 ring positions. As employed herein the 'steric blocking' is employed to indicate that the $(R^S)_m-Q$ ligand will normally not coordinate effectively for inclusion as the third ligand of the aluminum atom. Column 6, lines 45-58.

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The Examiner attempts to overcome the deficiencies in the Tang and Moore references by insisting that "Moore clearly teaches that the substitution can be made in 3 or 4 positions with electron donating group and in 5 positions with electron accepting group." As shown above, Moore does not specifically suggest this combination and certainly does not suggest this combination to the exception of all other possible combinations. Claims 8 and 15, as amended, are not suggested by Moore in view of Tang. Likewise, dependent claims 9-14 and 16-18 are not taught or suggested by the cited art.

In view of the foregoing, it is respectfully submitted that Claims 8 and 15 fully distinguish over the applied art and are thus in condition for allowance. By virtue of dependence from what is believed to be allowable independent Claims 8 and 15, it is respectfully submitted that Claims 9-14 and 16-18 are also presently allowable.

Respectfully submitted,



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MARKED-UP VERSION OF CLAIM AMENDMENTS

Claims 1-7 and 19-22 are deleted without prejudice.

Claims 8 and 15 are rewritten as follows:

8. (Amended) An organic material having tris(8-quinolino)aluminum(III) (Alq3) as a base unit wherein said Alq3 is substituted solely in the 3-, 4- and 5- positions and wherein:

said [base unit in the] 3- or 4-position is substituted with a group consisting of an electron-donor group; and

said [base unit in the] 5-position is simultaneously substituted with a group consisting of an electron-acceptor or p-delocalizing group.

15. (Amended) An electroluminescent device comprising:

an anode,

an organic hole injecting and transporting first layer [zone],

an organic electron injecting and transporting second layer [zone];

a cathode and

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a luminescent third layer of tris(8-quinolinolato)aluminum(III) (Alq3), wherein said [compound] Alq3 is substituted solely in the 3 or 4-position and the 5-position wherein the 3- or 4-position is substituted with a group consisting of an electron-donor group and simultancously substituted in said 5-position with a group consisting of an electron-acceptor or a p-delocalizing group.